

A1

[0023] To insure highest precision in approximating the function of X , the occurrence of roundoff errors should be minimized as much as possible. This may be accomplished by splitting each term of the approximate function into a pair of working-precision components whose sum is the value of that term. For the general base logarithm example given above, the value of $\log_b(2)$ is stored as a pair of working-precision numbers L_{hi} and L_{lo} , and the values of $\log_b(1/B_j)$ are stored in pairs of $T_{j,hi}$ and $T_{j,lo}$. For the example given here, precision is improved if $k L_{hi} + T_{j,hi}$ is representable exactly, that is without any roundoff errors, for all valid values of k and j . Consistent with $B_j = 0$, precision is also improved if $T_{0,hi} = T_{0,lo} = 0$. Also, consistent with $B_N = 1/2$, precision is further improved if $T_{N,hi} = L_{hi}$ and $T_{N,lo} = L_{lo}$. Finally, there can be a further improvement in precision if C , which approximates $\log_b e$, is represented so that $Z = C(YB_j - 1)$ is computed without roundoff error when $j = 0$ or $j = N$.

Please replace paragraph [0031] with the following paragraph:

A2

[0031] Table Value Calculations: The leading parts of the table values are all obtained by rounding the ideal values to a precision such that the least significant bit is 2^{-43} . Hence, $L_{hi} = \log_{10} 2$ rounded to lsb at 2^{-43} , and $T_{j,hi} = \log_{10}(1/B_j)$ is similarly rounded. The trailing parts are simply the working-precision approximation of the differences between the ideal values and the leading values. Hence $L_{lo} = \log_{10} 2 - L_{hi}$ rounded to 53 significant bits, and $T_{j,lo} = \log_{10}(1/B_j) - T_{j,hi}$ rounded to 53 significant bits.